Department of Toxic Substances Control

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November 15, 2017

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DTSC COMMENTS ON TECHNICAL MEMORANDUMS REGARDING THE DEVELOPMENT OF RISK-BASED SCREENING LEVELS FOR ADDITIONAL GROUNDWATER CONSTITUENTS, SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA

Dear Messrs. Zeller, Zorba, and Jones:

The Department of Toxic Substances Control (DTSC) reviewed the Technical Memorandums: "*Draft Development of Risk-Based Screening Levels for Additional Groundwater Constituents Detected at the Santa Susana Field Laboratory, Santa Susana, California,"* dated October 7, 2014, and the "*Development of Risk Based Screening Levels for Additional Groundwater Constituents at the Santa Susana Field Laboratory, Santa Susana, California*," dated April 6, 2017.

Attached are DTSC's Human Health and Ecological Risk Office (HERO) comments on the memorandums. The comments do not change the groundwater risk based screening levels but do provide the additional rationale that needs to be documented in the Technical Memorandums so that readers may reproduce the calculations. Please

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revise the memorandums as outlined in the attached comments and resubmit the revised final documents for DTSC review within 30 days of receipt of these comments. If you have questions, please contact me at 916-255-3684 or via email at Julie.Lincoln@dtsc.ca.gov.

Sincerely,

Julie Lincoln

Julie Lincoln, PE
Department of Toxic Substances Control

Attachments: *DTSC's Human Health and Ecological Risk Office (HERO) comments*

cc: (via email)

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Department of Toxic Substances Control

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TO: Julie Lincoln, PE
Santa Susana Field Laboratory Project Support Unit
DTSC-Cal Center

FROM: Donald V. Greenlee, Ph.D., DABT
Staff Toxicologist

DATE: August 28, 2017

SUBJECT: HERO Comments on Stantec's (formerly MWH) Technical Memorandum: "Draft Development of Risk-Based Screening Levels for Additional Groundwater Constituents Detected at the Santa Susana Field Laboratory, Santa Susana, California," dated October 7, 2014

PCA: 22120 Site Code-WP: 300232-48

The Human and Ecological Risk Office (HERO) of the Department of Toxic Substances Control (DTSC) has reviewed MWH's (now Stantec) Technical Memorandum (TM) entitled "Draft Development of Risk Based Screening Levels for Additional Groundwater Constituents Detected at the Santa Susana Field Laboratory, Santa Susana, California," dated October 7, 2014 (MWH, 2014). HERO is providing these comments to ensure greater transparency into how the groundwater risk-based screening levels (GW-RBSLs) contained in this TM were calculated. These comments also apply to MWH's TM entitled "Development of Risk Based Screening Levels for Additional Groundwater Constituents at the Santa Susana Field Laboratory, Santa Susana, California," dated April 6, 2017 (MWH, 2017), because both TMs rely on referencing their methodology to Appendix 7-C ("Methodology and Results of Developing Risk-Based Screening Levels for Groundwater") in the "Draft Site-Wide Groundwater Remedial Investigation Report, Santa Susana Field Laboratory, Ventura County, California," dated December 2009 (MWH, 2009).

Background

The former Santa Susana Field Laboratory (SSFL) occupies approximately 2,850 acres of hilly terrain located in the southeast corner of Ventura County, approximately 29 miles northwest of Los Angeles, California. SSFL is jointly owned by The Boeing Company and the National Aeronautics and Space Administration (NASA), and a portion of SSFL includes facilities owned by the U.S. Department of Energy (DOE).

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Since the late 1940's, SSFL was used for research and development of rocket engines, lasers, liquid metal heat exchanger components, nuclear energy reactors and associated technologies.

Rocket engines were vertically mounted to steel test stands anchored to bedrock outcroppings where the engines underwent brief activation tests. After each test, engines were washed with degreasing solvents, which drained into unlined earthen impoundments, and engine parts were disassembled for performance inspection. One of the main degreasing solvents, trichloroethylene (TCE), has impacted SSFL groundwater. Groundwater at SSFL is undergoing chemical characterization and cleanup as part of a Resource Conversation and Recovery Act (RCRA) Corrective Action Program. The California Environmental Protection Agency's (Cal/EPA) Department of Toxic Substances Control (DTSC) is providing oversight of this RCRA action. To help guide this process, groundwater chemical-specific risk-based screening levels (GW-RBSLs) have been developed. GW-RBSLs provide chemical-specific groundwater concentrations below which the health risks associated with potential chronic exposures to each distinct chemical are considered negligible.

The methodology for calculation of GW-RBSLs was provided in Appendix 7-C of the Site-Wide Groundwater Remedial Investigation Report, dated December 2009 (MWH, 2009). Since this document was constructed, MWH (now Stantec) has added 15 additional GW-RBSLs to the 2009 list, as provided in MWH's two TMs (MWH, 2014; MWH, 2017). The purpose of this review was to ensure the transparency of these GW-RBSL calculations.

General Comments on the RBSL TMs

The methods and equations originally provided in Appendix 7-C of the Site-Wide Groundwater Remedial Investigation Report (MWH, 2009) for calculation of GW-RBSLs, and subsequent summaries of these methods in MWH's TMs (ie, MWH, 2014 and MWH, 2017) provide for a basic understanding of the GW-RBSL calculation methodology. HERO found that additional clarification was needed for some input parameters, and minor improvements in the description of the GW-RBSL calculation methodology could be made. These are discussed in Specific Comments below. HERO recommends that these improvements be incorporated as revisions to MWH's 2014 TM (MWH, 2014).

Specific comments listed below refer to table numbers (and titles) and page numbers (and sections) in the Appendix 7-C document (MWH, 2009) because it provides the main methodology for the GW-RBSL calculations. Table numbers and page numbers can be revised to accommodate their correct order within the 2014 TM (MWH, 2014). For comparison with Appendix 7-C, it may be advantageous to also refer to appropriate Appendix 7-C tables and section titles.

Specific Comments on the 2014 TM:

1) **Table 2 (Exposure Assessment Parameters for Residential Receptors)**: The groundwater non-VOC contact rate (CR) for the Residential Adult should be listed as 1.54 L/day instead of 1.5 L/day. It appears that Footnote F is cited to document the source of this (1.54 L/day) value. Footnote F mistakenly refers to DTSC's PEA Guidance Manual. It should instead show the CR calculation (ie, 0.022 L/kg-day x 70 kg BW = 1.54 L/day), and document the source of the 0.022 value as: DTSC. 1993. "CalTOX, A Multimedia Total Exposure Model for Hazardous-Waste Sites." December.

   Also, within the Exposure Parameter "ATn = Averaging time for non-carcinogens," add: "(ATn = ED)."

2) **Table 3 (Human Health Toxicity Criteria):** Ensure that all oral Cancer Slope Factors and non-cancer Reference Doses for the additional groundwater Contaminants of Potential Concern (COPCs) are provided in Table 3 . These are shown on the following page.

3) **Table 4 (Groundwater Risk-Based Screening Levels):** Add a footnote to denote where a groundwater-RBSL refers to a surrogate compound. For the new additional COPCs, these are endrin for endrin aldehyde and endrin ketone, and 2,4-dichlorophenoxyacetic acid for Dichloroprop.

   For the TPH-o groundwater RBSL, add a footnote to indicate that it was assumed that the TPH-o fraction was comprised of 50% aromatic and 50% aliphatic TPH-o, and show the RBSL equation, ie:

   Total RBSL = 1/[(1/(2 x RBSL-aromatic)) + (1/(2 x RBSL-aliphatic))].

4) **Text to the Tech Memo:**

   Page 6, third line from top of page: The mathematical explanation in parentheses, ie, "(= ED for non-carcinogens; 70 yrs for carcinogens)," should either be removed altogether or the "70 yrs" term should be corrected to "75 yrs."

   Page 6, Section 2.3 (Toxicity Assessment): "HERO Note-3 (current version June 2017; http://www.dtsc.ca.gov/AssessingRisk/humanrisk2.cfm)" should be added to the top of this list.

   Page 7, Section 2.3 (Toxicity Assessment): The first line on this page states that to calculate TPH GW-RBSLs, it was assumed that TPH chain fractions were comprised of 80% aliphatic and 20% aromatic. But, as explained in the toxicity criteria table above, a different assumption was used, ie, 50% aliphatic and 50% aromatic. Please rectify this.

Toxicity Factors for Additional Groundwater Constituents

COPC	Surrogate	CSFo $(mg/kg\text{-}day)^{-1}$	RfDo (mg/kg-day)
SVOCs			
n-Nitrosodiphenyl-amine	--	9.0E-3	--
Herbicides			
Dicamba	--	--	3.0E-2
Dichloroprop	2,4-Dichloro-phenoxyacetic acid	--	1.0E-2
4-(2,4-Dichloro-phenoxy)- butanoic acid (2,4-DB)	--	--	8.0E-3
2-Methyl-4-choro-phenoxyacetic acid (MCPA)	--	--	5.0E-4
2-(2-Methyl-4-chlorophenoxy) propionic acid (MCPP)	--	--	1.0E-3
Insecticides			
4,4'-Dichlorodiphenyl-trichloroethane (DDT)	--	3.4E-1	5.0E-4
Delta-Hexachloro-cyclohexane (δ-BHC)	--	1.8E0	4.2E-3
Endrin aldehyde	Endrin	--	3.0E-4
Endrin ketone	Endrin	--	3.0E-4
Mirex	--	1.8E+01	2.0E-4
Groundwater TPH			
Oil range Total Petroleum Hydrocarbons (TPH-o), aromatic	--	--	3.0E-2
Oil range Total Petroleum Hydrocarbons (TPH-o), aliphatic	--	--	2.0E+00
Metals			
Lithium	--	--	2.0E-3
Zirconium	--	--	8.0E-5

Page 8, Equation 2: As this equation is written, either the non-cancer RfD is used in place of the "Toxicity Value," or (1/CSF) is used. The last line defining parameters in Equation 2 shows the opposite substitution for "Toxicity Value." Please make this correction.

Conclusions and Recommendations: HERO recommends the clarifications explained above be addressed prior to approval of the 2014 GW-RBSL TM (MWH, 2014). Finally, please date the 2014 GW-RBSL TM as having been revised as of the currently applicable date.

If you have any questions about these comments, please call me at the Chatsworth DTSC office (818)717-6594.

Don Greenlee
DTSC-Chatsworth

HERO Internal Reviewer: James M Polisini, Ph.D.
Supervising Toxicologist
Human and Ecological Risk Office

REFERENCES

MWH. "Draft Site-Wide Groundwater Remedial Investigation Report, Santa Susana Field Laboratory, Ventura County, California." December 2009. Available at: http://www.dtsc.ca.gov/SiteCleanup/Santa_Susana_Field_Lab/ssfl_document_library.cfm.

MWH. "Development of Risk Based Screening Levels for Additional Groundwater Constitutents at the Santa Susana Field Laboratory, Santa Susana, California," dated April 6, 2017.

MWH, "Draft Development of Risk Based Screening Levels for Additional Groundwater Constituents Detected at the Santa Susana Field Laboratory, Santa Susana, California," dated October 7, 2014.